Report for 2005CO113B: Hydrologic Analysis, Forecasting and Simulation of the Upper Colorado River System

Publications

- There are no reported publications resulting from this project.

Report Follows

Streamflow and basin yield are important issues to water resource management. In an era when water is fully appropriated and water maangers rely on computerized models to help them manage water resources, enhancing and improving the accuracy and sensitivity of models and datasets becomes a vital tool for satisfying all calls on water resources.

Keedy is working with the Colorado River Water Conservation District to enhance the Colorado River System Simulation developed by the Bureau of Reclamation using the RiverWare software program.

Comparison of streamflow data sets with naturalized streamflow data extended backward using stochastic correlation techniques, naturalized streamflows reconstructed from tree ring records spanning from around 1500 to 1999 (the reconstruction has not yet been completed), and generated streamflows based on stochastic techniques will help to test the sensitivity of the model for use in prediction and management decisions. For this purpose, parametric and non-parametric methods will be applied. Steamflow data scenarios will be run to test the sensitivity of the system to varations within the data sets. Key parameters will be used to characterize the response of the basin to various conditions. These parameters include critical reservoir levels (such as dead pool, minimum power pool, top of active conservation, and spillway elevation), reservoir releases, and shortage and surplus occurrences for each state. The parameters will be compared by determining their probabilities of occurrence under each different streamflow scenarios.

Another objective of the study is to determine the safe yield of the upper basin. This task will be accomplished by increasing the demands of the upper basin in order to achieve a given, accepted probability of shortage occurrences. While none of the streamflow data sets are quite ready to be used in the model for the final results of this study, currently available streamflows have been used to run the model so analysis techniques can be developed.

To date, data formatting and input issues have been addressed by creating conversion templates to correlate data from one source to data from another source. Code which allows insertion of many slots of data at one time was obtained, allowing alteration between the data sets.
The model was run simulating the currently accepted streamflow data according to the index-sequential method, a non-parametric technique often used for such purposes. The output of this technique is currently being analyzed to determine the best process to determine variations in the response of the river system to various streamflow simulations.

Goals of the project include the comparison of various methods of analysis, and an exploration of the use of tree ring data to establish historical streamflows and their effects in the absence of human collected streamflow data.

Additional funding for this project is provided by Colorado River Water Conservation District. The projected completion date for this study is December 2006.

Keedy confers with David Merritt and Dave Kanser at the Colorado River Water Conservation District offices.